LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A matrix control network, comprising:

a hierarchical control network, said hierarchical control network comprising a plurality of data buses ~~and a plurality of control network nodes~~ arranged in a hierarchical structure, said data buses including a first-tier data bus and a plurality of lower-tier data buses;

a plurality of control network nodes arranged in a hierarchical structure according to their relative positioning in the hierarchy of data buses, each of said data buses communicatively coupling ~~one or more~~ a plurality of said control network nodes; and

a supervisory network, said supervisory network comprising:

a supervisory communication bus physically distinct from the data buses; ~~and~~

a plurality of supervisory nodes communicatively coupled to said supervisory communication bus, said supervisory nodes including a plurality of supervisoring monitoring nodes each ~~of said supervisory nodes~~ configured to monitor at least one of the lower-tier data buses of said hierarchical control network, and at least one supervisory reporting node communicatively coupled to said first-tier data bus, whereby one or more control network nodes coupled to said first-tier data bus are apprised of events occurring on the lower-tier data buses.

2-39. (Canceled)

40. (Previously Presented) The matrix control network of claim 1, wherein at least one of the control network nodes communicatively coupled to a given data bus is configured to operate as a master node and the other control network nodes communicatively coupled to that data bus are configured to operate as slave nodes.

41. (Currently Amended) The matrix control network of claim 40, wherein each of said supervisory monitoring nodes comprises a supervisory node slave unit and a supervisory node master unit, said supervisory node slave unit connected to one of said data buses of said hierarchical control network, and said supervisory node master unit connected to said supervisory communication bus.

42. (Previously Presented) The matrix control network of claim 41, wherein the master node for each data bus systematically polls the slave nodes connected to the data bus.

43. (Currently Amended) The matrix control network of claim 42, wherein the master node for each data bus polls the supervisory node slave unit of the supervisory monitoring node connected to the data bus.

44. (Currently Amended) The matrix control network of claim 43, wherein the supervisory node slave unit of each supervisory monitoring node refrains from

transmitting over the data bus to which the supervisory monitoring node is connected unless authorized by the master node connected to the data bus.

45. (Currently Amended) The matrix control network of claim 1, wherein a supervisory monitoring node detecting an error or exception condition transmits an alert message over said supervisory communication bus.

46. (Previously Presented) The matrix control network of claim 45, wherein said alert message is a broadcast to all of the supervisory nodes communicatively coupled to said supervisory communication bus.

47. (Currently Amended) The matrix control network of claim 45, wherein:

~~one of said data buses comprises a first-tier data bus;~~

one of the control network nodes communicatively coupled to said first-tier data bus is configured to operate as a first-tier master node;

~~at least one of said supervisory nodes is connected to said first-tier data bus,~~ said ~~at least one~~ supervisory reporting node ~~being~~ is configured to communicate with said first-tier master node; and

said ~~at least one~~ supervisory reporting node relays information pertaining to said alert message to said first-tier master node.

48. (Previously Presented) The matrix control network of claim 1, wherein each of said control network nodes comprises a control network node slave unit and control network node master unit.

49. (Previously Presented) The matrix control network of claim 48, wherein each of said control network nodes comprises a pair of transceivers and a pair of processors, a first one of said pair of transceivers being utilized by said control network node slave unit and a second one of said pair of transceivers being utilized by said control network node master unit, and a first one of said pair of processors being connected to said first one of said pair of transceivers and utilized by said control network node slave unit and a second one of said pair of processors being connected to said second one of said pair of transceivers and utilized by said control network node master unit.

50. (Previously Presented) The matrix control network of claim 49, wherein:

each of said supervisory nodes comprises a supervisory node slave unit and a supervisory node master unit; and

each of said supervisory nodes comprises a second pair of transceivers and a second pair of processors, a first one of said second pair of transceivers being utilized by said supervisory slave node unit and a second one of said second pair of transceivers being utilized by said supervisory node master unit, and a first one of said second pair of processors being connected to said first one of said second pair of transceivers and utilized by said supervisory node slave unit and a second one of said second pair of processors being connected to said second one of said second pair of transceivers and utilized by said supervisory node master unit.

51. (Previously Presented) The matrix control network of claim 40, wherein said supervisory nodes communicate over said supervisory communication bus according to a master-slave communication protocol.

52. (Currently Amended) A method of configuring a control network system, comprising the steps of:

arranging a plurality of data buses in a hierarchical structure, said data buses including a first-tier data bus and a plurality of lower-tier data buses;

communicatively coupling a plurality of control network nodes ~~and a~~ to said plurality of data buses ~~in a hierarchical control network structure~~, said control network nodes arranged in a hierarchical structure according to their relative positioning in the hierarchy of data buses;

communicatively coupling a plurality of supervisory nodes to a supervisory communication bus physically distinct from the data buses;

monitoring communications over said data buses using said supervisory nodes; ~~and~~

communicating among said supervisory nodes over said supervisory communication bus according to a master-slave communication protocol; and

alerting one or more control network nodes coupled to said first-tier data bus of events occurring on the lower-tier data buses, via the supervisory nodes coupled to said supervisory bus.

53. (Previously Presented) The method of claim 52, wherein said step of communicatively coupling said plurality of control network nodes and said plurality

of data buses in said hierarchical control network structure comprises the step of connecting each of said data buses to one or more of said control network nodes, and configuring at least one of the control network nodes attached to a given data bus to operate as a master node and the remainder of the control network nodes attached to the given data bus to operate as slave nodes.

54. (Previously Presented) The method of claim 53, further comprising the step of, for each supervisory node, connecting a supervisory node slave unit to one of said data buses, wherein the step of communicatively coupling said plurality of supervisory nodes to said supervisory communication bus comprises the step of, for each supervisory node, connecting a supervisory node master unit to said supervisory communication bus.

55. (Previously Presented) The method of claim 54, further comprising the step of communicating among said control network nodes according to a master-slave communication protocol by systematically polling the slave nodes connected to the data bus from the master node connected to the data bus.

56. (Previously Presented) The method of claim 55, further comprising the step of polling the supervisory node slave unit connected to the data bus when polling the other slave nodes connected to the data bus.

57. (Previously Presented) The method of claim 54, further comprising the step of transmitting an alert message over said supervisory communication bus

when the supervisory node slave unit detects an error or exception condition on the data bus that it is monitoring.

58. (Previously Presented) The method of claim 57, wherein said alert message is broadcast to all of said supervisory nodes over the supervisory communication bus.

59. (Previously Presented) The method of claim 57, further comprising the step of relaying information pertaining to said alert message to a master node connected to a higher-tier data bus relative to the data bus which is being monitored by the supervisory node sending the original alert message.

60. (Previously Presented) The method of claim 59, wherein said master node connected to said higher-tier data bus is a first-tier master node.

61. (Previously Presented) The method of claim 54, wherein each of said control network nodes comprises a control network node slave unit and control network node master unit.

62. (Previously Presented) The method of claim 61, wherein each of said control network nodes comprises a pair of transceivers and a pair of processors, a first one of said pair of transceivers being utilized by said control network node slave unit and a second one of said pair of transceivers being utilized by said control network node master unit, and a first one of said pair of processors being

connected to said first one of said pair of transceivers and utilized by said control network node slave unit and a second one of said pair of processors being connected to said second one of said pair of transceivers and utilized by said control network node master unit.

63. (Previously Presented) The method of claim 62, wherein each of said supervisory nodes comprises a second pair of transceivers and a second pair of processors, a first one of said second pair of transceivers being utilized by said supervisory slave node unit and a second one of said second pair of transceivers being utilized by said supervisory node master unit, and a first one of said second pair of processors being connected to said first one of said second pair of transceivers and utilized by said supervisory node slave unit and a second one of said second pair of processors being connected to said second one of said second pair of transceivers and utilized by said supervisory node master unit.

64. (Currently amended) A control network system, comprising:

a plurality of control network data buses arranged in a hierarchical structure, said control network data buses including a first-tier data bus and a plurality of lower-tier data buses;

a plurality of control network nodes connected to said control network data buses, each of said control network data buses communicatively coupled to one or more of said control network nodes;

a supervisory bus physically distinct from said network data buses; and

a plurality of supervisory nodes connected to said supervisory bus and to said control network data buses, said plurality of supervisory nodes configured to monitor said control network data buses and to alert one or more control network nodes coupled to said first-tier data bus of events occurring on the lower-tier data buses.

65. (Previously Presented) The control network system of claim 64, wherein each of said control network nodes comprises (i) an uplink transceiver, and (ii) a downlink transceiver that communicates over a different data bus than said uplink transceiver.

66. (Previously Presented) The control network system of claim 64, wherein at least one of the control network nodes connected to a given data bus is configured to operate as a master node, and the remainder of the control network nodes connected to the data bus are configured to operate as slave nodes.

67. (Previously Presented) The control network system of claim 66, wherein each of said supervisory nodes is configured as a slave node with respect to the data bus which it monitors.

68. (Previously Presented) The control network system of claim 67, wherein the master node for each data bus systematically polls each of the slave nodes as well as the supervisory node that monitors the data bus.

69. (Previously Presented) The control network system of claim 67, wherein a supervisory node detecting an error or exception condition on the bus it is monitoring transmits an error message over said supervisory bus.

70. (Previously Presented) The control network system of claim 69, wherein said error message comprises a broadcast message intended for reception by each of said supervisory nodes.

71. (Previously Presented) The control network of claim 66, wherein the supervisory node takes over for the master node on the data bus which the supervisory node is monitoring upon detecting a failure of the master node.

72. (Currently Amended) A control network system, comprising:

a plurality of nodes;

a plurality of control network data buses connected to distinct sets of said nodes and arranged in a hierarchical structure, said plurality of control network data buses comprising a first-tier control network data bus and a plurality of lower-tier data buses, each distinct set of nodes comprising a master node and one or more slave nodes;

a supervisory bus physically distinct from said network data buses; ~~and~~

a plurality of supervisory monitoring nodes connected to said supervisory bus and to said lower-tier buses, each of said supervisory monitoring nodes configured to monitor one of said lower-tier buses; and

at least one supervisory reporting node communicatively coupled to said first-tier control network data bus and to said supervisory bus, whereby one or more control network nodes coupled to said first-tier control network data bus are apprised of events occurring on the lower-tier data buses via communications over said supervisory bus.

73. (Currently Amended) The control network of claim 72, wherein each of said supervisory monitoring nodes comprises a first transceiver connected to one of said lower-tier data buses, and a second transceiver connected to said multi-master supervisory data bus.

74. (Currently Amended) The control network of claim 72, whereby communications on said lower-tier buses monitored by said supervisory monitoring nodes are made accessible to the first-tier master node.

75. (Currently Amended) A control network, comprising:

a plurality of first-tier slave nodes;

a first common bus connecting said first-tier slave nodes in a loop configuration;

a second physically distinct common bus connecting a plurality of second-tier slave nodes in a loop configuration, said second common bus further connected to at least one of said first-tier slave nodes functioning as a second-tier master node with respect to the second common bus; and

a first-tier master node connected to said first common bus, said first-tier master node comprising an uplink transceiver connected to said second common bus and a downlink transceiver connected to said first common bus, wherein said uplink transceiver of said first-tier master node is configured to function as a second-tier slave node on said second common bus, thereby allowing said first-tier master node to monitor communications on said second common bus.

76. (Previously Presented) The matrix control network of claim 1, wherein said control network nodes are arranged in a loop configuration on at least one of said plurality of said data buses.

77. (Previously Presented) The matrix control network of claim 76, wherein said supervisory nodes are arranged in a loop configuration on said supervisory communication bus.

78. (Previously Presented) The method of claim 52, wherein said control network nodes are arranged in a loop configuration on at least one of said plurality of said data buses.

79. (Previously Presented) The method of claim 78, wherein said supervisory nodes are arranged in a loop configuration on said supervisory communication bus.

80. (Previously Presented) The control network system of claim 64, wherein said control network nodes are arranged in a loop configuration on at least one of said plurality of said control network data buses.

81. (Previously Presented) The control network system of claim 80, wherein said supervisory nodes are arranged in a loop configuration on said supervisory bus.

82. (Previously Presented) The control network system of claim 72, wherein the master node and one or more slave nodes on each of said control network data buses are arranged in a loop configuration.

83. (Previously Presented) The control network system of claim 82, wherein said supervisory nodes are arranged in a loop configuration on said supervisory bus.